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INVESTIGATION OF THE POTENTIAL PHYSIO-PATOLOGICAL EFFECTS OF ALUMINIUM IN PATIENTS WITH ALZHEIMER SPECIFIC SYMPTOMS

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Abstract

In the past few years, there has been developed an idea about the connection between the Presence of aluminium in human blood and Alzheimer disease. The goal of our study was to demonstrate that there is a connection between the aluminium in the patients' blood (who presented specific symptoms) and Alzheimer disease's occurrence, having a physiopathological determination. Aluminium dosage in a group of patients was analyzed (according to some pre-established procedures). 65% of the patients had 1-5% higher than normal values for aluminium level. Aluminium intoxication could lead to syndromes which could affect peoples' activity. The general physicians must be aware of the need for detecting the aluminium in blood, of interpreting the physiopathological changes and of monitoring these changes in order to detect early symptoms of Alzheimer disease.

Keywords *Aluminium, Alzheimer disease, patients.*

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Introduction

Aluminium was discovered by Frederich Wohler in 1827 (1-3). Aluminium is one of the most widespread non-ferrous metals in the earth shell and is part of the heavy metals group, being used in all industrial branches, including the pharmaceutical and food ones. Many researchers endorse the idea of chronic aluminium intoxication occurrence, frequently involved in the physiopathogeny of patients with Alzheime disease (4-6). The goal of our study was to analyse the potential physiopathological relationships between clinical and paraclinical symptoms of patients with specific Alzheimer symptoms, which could be related toto an increased values of aluminium in blood.

Experiment Details

Our study was carried out on two batches who came to the family doctor and who were dispensarized; the groups were carefully chosen and the investigations were carried out on a three-year period. The control group consisted of 90 patients clinically and paraclinically healthy. The study group was represented by 90 patients whose clinical status was recorded in the patients' chart. Thus, clinical and paraclinical signs which have been recorded were: memory disturbances, slightly depression states, asthenia, dyspnea, headaches, bloating, dry skin, loss of appetite, slight anemia. The study group was chosen by medical history, especially those people who worked or had a prolonged closeness with environments rich in aluminium. Testing of the two batches was carried out according to the following protocol: There were performed: hemogramm, ESR, glicemia, bilirubin, transaminase, total cholesterol, triglycerides, creatinine.

In both batches we measured the aluminium as well. Aluminium was measured from the patients' blood according to the following laboratory protocol: **Preparing the patient** – à jeun (on an empty stomach). **Sample** – venous blood. *Recipent of sampling* - vacutainer for metals containing EDTA as anticoagulant. **Necessary processing after sampling** –not necessary. **Volume of the sample** – as much as the vacuum allows. **Causes for rejecting the sample** - highly hemolyzed, lipemic sample. **Sample stability** – separate serum is stable 1 month in -20°C. **Method** - spectrometer with atomic absorbtion (AAS) which is part of the optical methods UV-VIS and it is based on measuring the radiant power absorbed by a mass of free atoms. As at the regular temperature only the metallic mercury can release steam of free atoms, the samples have to be atomised by heating. Means of evaporation and atomisation which have imposed in AAS are the flame and the electrothermic evaporation. **Reference values** - Aluminium <10 μg/L (ng/mL). **Limits and interferences**: a high level of seric gadolinium or iodine interferred with the tests for metals; therefore, in the case of contrast material based on gadolinium or iodine being used, sampling must be postponed for at least 96 hours. In our study, we did not have such interferences.

Results and Discussions

Control and study groups were carefully selected, consisting in males 45% and females 55%, aged 40-50 and 50-60. In the control group we obtained normal parameters both clinically and paraclinicallyand the aluminium levelsachieved an average of 4 μg/L. In the study group, we obtained, in 65 patients, a higher than normal level of aluminium (<10 μg/L) by (1 - 5%). At the same time, in 3 cases, we obtained an edge limit (2.7%) and paraclinically a slight iron deficiency anemia (2.7%). In the study group, we obtained, in 65 patients, a higher than normal level of aluminium (<10 μg/L) by (1 - 5%). At the same time, in 3 cases, we obtained an edge limit (2.7%) and paraclinically a slight iron deficiency anemia (2.7%). Patients aged 50-60, the number of males was equal to that of females, according to the values previously described. In the control batch, there is not the case of differentiation as the aluminium level was within normal limits. In our study we observed that patients who had been exposed a long time to aluminium (workers in specific industry) had high levels of aluminium in blood. We noticed a direct connection between the described symptomatology, age and duration of exposure to aluminium. Actually, aluminium reaches the human body through food, breathing and direct contact with the skin. Long term assimilation of high concentrations of aluminium can lead to severe health problems, such as: loss of memory, dementia, central nervous system damage, aggitation, Parkinson's disease (5-8). Alongside the described symptomatology, we noticed that inhaling aluminium, being divided in aluminium oxide powder was reported as main cause of fibromatous (4-7). Lately, specialists have stated that there is a high concentration of aluminium in the people's body, that can weekly reach 2 mg of aluminium per kg having in view that the borne quantity is of maximum 1 mg (5), (9-12). Our study, which is a dynamic research, yet notices that in 65% of the patients in the researched batch, who had proples with their memory, dyspnea, depression, anemia, the aluminium level increased by 1-2 mg (1-5%). We mention that the alertness as regards aluminium intoxication was issued last century, but physicians have ignored the warnings. In the literature, it is a known fact that "around 1940, food cooked in aluminium frying pans for a dog produced it an intoxication so severe that it could not keep its balance." By changing those dishes with enamelled ones the dog's health status improved a lot. It seems that aluminium is responsible for many imbalances in people's body, the most dreadful being dementia that inflicts millions of people worldwide (3), (13-16). In our study, we noticed changes of memory in patients belonging to the researched batch and, in addition, an increase in aluminium level in their blood but we cannot state that these changes shall end up in Alzheimer syndrome. Aluminium easily reaches in the human blood from the environment. River water

treatment plants use aluminium sulphate which crods the particles and the microorganisms from water leading to their sedimentation. It seems that aluminium from untreated water, of natural origin, is not assimilated easily by the body and does not have harmful effects on people's health, whereas the treated water can be a source of aluminium intoxication (4), (17-20). It would be advisable to record on the lable of still mineral water bottles, recipients, dishes the existing aluminium quantities as, according to certain statistics, there is a direct proportionality beteen Alzheimer syndrome occurrence and the people who have eaten food prepared in aluminium dishes. Aluminium intake can also come from the air (as natural reservoir) at least 4 μg/day and in polluted air, in the industrial areas the quantity can increase up to 100 μg /day. In our study, we noticed from the patients' medical history that 65% of them worked or had contact with aluminium or its compounds, one way or another. During the aluminium production process it is accepted that workers can breath in from 3.5 up to 7 mg/day. Another source of aluminium intoxication is the non-ferrous content of certain medications, such as enteric coated acid acetilsalicilic, in which case children are the victims and in certain gastric buffers. In our study, we noticed such a status in 5 patients (4.5%), aluminium level being increased. WHO estimated that those who consume such types of medications can bring into their bodies up to 5 g/day. Both in our study and in speciality literature we noticed that the disorders described by patients and more severe in those aged 50 and 60, proving that the action of aluminium increases over time, once it is accumulated into the body. A study in Australia showed that the dose of aluminium found in cans for beverages and juices is higher with 5% than that in case of bottles. In a study, belonging to Romanian physicians, carried out on 1,000 people by measuring the toxic metals in the hair it has been found out that 30% of the patients have a higher aluminium level that the accepted one (5), (21-25). Aluminium can harm the body of patients with dialysis. In addition, aluminium in found in high quantities and can become toxic in cereals, cakes, biscuits, pasta, mushrooms, spinach, radishes, teas, beverages containing adulterants with aluminium (e.g. cacao). It has been observed that aluminium increases over the accepted limit when foods, fish and meat are cooked in aluminium dishes or are wrapped in aluminium foil (tinfoil undergoing high temperatures in the oven). For health, heaters made of aluminium are also harmful by causing dizziness, eyesight disturbances and even the beginning of paralysis.In patients undergoing excessive dialysis there have been reported cases of encephalopathy, osteomalacia, anemia, onset of Parkinson's disease and, finally, occurrence of the dementia syndrome with mental disturbances, loss of memory, early aging and Alzheimer syndrome (4), (26-29). It is worth noticing that in our research, as well as in others, we have taken into consideration the same clinical markers, loss of memory, desorientation and depression. Literature emphasises that patients having Alzheimer syndrome, exposed for a long time to aluminium during their lifespan, suffering because of this or deceased, have in the brain cells 30 times more aluminium than the average, deposited in the neuronal seath and within the neuron bodies. In literature, it has been cited that a tumor of the esophagus diminished when the patients stopped using aluminium dishes. The results of our study have been analysed statistically using the Student test, $p<0,05$ (95% CI) and it was considered statistically significant. As a result of our study, we can state the following: There should be avoided, by research on production lines, the foods, water, juices which might present high quantities of aluminium. There should be researched the level of aluminium from cosmetics. In aluminium industry, workers should be offered conditions in order not to inhale aluminium oxide powders. There should be researched the physiopathological relationship between the aluminium in cosmetics and certain breast tumors. E173 dye should be excluded from foods (cereals, bread, cakes and biscuits) as patients having Alzheimer syndrome and Parkinson's disease used these products for a long time.

Conclusions

On the basis of our study (as it has been noticed in the literature) we can conclude that there is a direct proportionality between the aluminium quantity found in the environment (foods, water, air) and certain disorders, out of which the most important are losses of memory, disorientation and depression. Our study has proven this physiopathological correlation.

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